

ADDITIONAL FEES:

A check in the amount of \$144.00 is enclosed to cover the cost of 8 additional claims in excess of those already paid for. Should the check prove insufficient for any reason, authorization is hereby given to charge any such deficiency to our Deposit Account No. 01-0268.

REMARKS

In the last Office Action, claims 1-7, 10-12, 13 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,104,030 to Chiba et al. ("Chiba"). The Examiner stated that Chiba discloses an optical waveguide for a scanning near-field optical microscope that has a bent portion for reflecting light in the waveguide by forming a reflecting plane and having reflective material in the waveguide (citing col. 3, lines 60-67; col. 4, lines 59-67; and col. 5, lines 1-7). The Examiner further stated that the claimed cantilever geometry and positioning groove are obvious limitations.

Applicants and applicants' undersigned attorney acknowledge with appreciation the indication of allowable subject matter with respect to claims 8 and 9. However, for the reasons stated hereinbelow, applicants respectfully submit that claims of broader scope are allowable over the prior art of record.

By the present response, the specification has been amended in minor respects to correct minor informalities.

Claim 13 has been canceled without prejudice or admission and claims 1-12 and 14-22 have been amended in formal respects to improve the wording and independent claims 1 and 14 have been further amended to more particularly point out and distinctly claim the novel aspects of the present invention by reciting that the optical waveguide is a thin film waveguide formed by depositing a thin film on a support member.

For instance, amended independent claim 1 recites an optical waveguide probe comprising a support substrate, a thin film optical waveguide formed of a thin film deposited on the substrate and having an elongated portion over the support member and a cantilever portion extending beyond the support member, a probe provided at a tip of the optical waveguide and comprising sharp tip extending in a substantially vertical direction with respect to the optical waveguide, and a minute aperture at the tip of the probe, and a bent portion joining the optical waveguide and the probe, the bent portion having a deflecting function for deflecting a propagated light in the optical waveguide.

In the embodiment shown in Figs. 1A-1D of the application drawings, an optical waveguide probe 50 is comprised of a thin film optical waveguide 2 formed on a support member 1. The optical waveguide 2 includes an elastic

cantilever portion 3 and a probe portion 9 at its tip. A bent portion 10 joins the probe portion 9 to the cantilever portion. The probe portion 9 is sharpened and has a minute aperture 5 at its tip. The optical waveguide 2 has a multi-layer thin film structure deposited on the support member 1 including a thin film core 4 for propagating light at the substantially center portion and a thin film cladding 6 surrounding the core. The cantilever portion 3 and the probe portion 9 are covered with light shielding films, and a portion of the tip of the probe portion 9 which is not covered with the light shielding film, serves as the minute aperture 5.

Figs. 2A-2F of the drawings illustrate a method of producing the optical waveguide probe. A silicon dioxide film 321 is patterned on a substrate 31. A mold which forms the bent portion of the optical waveguide is formed on the substrate using the patterned silicon dioxide 32 as a mask and performing anisotropic etching such that two inclined surfaces 36 each having a given angle relative to a lower surface 37 of the substrate 31 are formed. The two surfaces intersect with each other at 90 degrees.

A thin film optical waveguide 33 is deposited on the mold by depositing a thin film cladding material on the bent mold, depositing a patterned thin film core material thereon, and depositing another thin film cladding material over the

core. A mask 34 is then formed on the optical waveguide 33 for patterning it into a cantilever shape. Then, a portion of the optical waveguide 35 is formed to extend from the substrate 31 by etching the substrate 31 so that the cantilever-like optical waveguide probe 50 is formed.

No corresponding structure is disclosed or suggested by the prior art of record.

Chiba disclose an optical waveguide probe formed by bending an optical fiber having a sharpened tip. More specifically, the optical probe disclosed by Chiba is formed of an optical fiber 1 waveguide coated with a metal film 4 and having a sharpened tip. A minute aperture 5 at the tip is not covered by the metal coating film 4. The metal coating film 4 has a curved surface portion 4a retreating gradually from the aperture part to an outer circumference of the waveguide and a tapered surface portion 4b contiguous with the curved surface portion 4a and disposed on the outer circumference of the waveguide. As disclosed by Chiba, the optical fiber 1 may comprise a single-mode fiber, a multi-mode fiber, a polarization-preserving fiber, or a capillary.

However, Chiba fails to disclose or suggest that the probe is a thin film probe formed by depositing one or more thin films on a substrate as recited by each of the amended independent claims. In the absence of any disclosure of the thin film optical probe recited by amended independent claims

1, 14, 17 and 23, and 31, and the additional limitations thereto recited in the dependent claims, anticipation cannot be found. See, e.g., Continental Can Co. USA v. Monsanto Co., 20 USPQ.2d 1746, 1748 (Fed. Cir. 1991) ("When more than one reference is required to establish unpatentability of the claimed invention anticipation under § 102 can not be found"); and Akzo N.V. v. U.S. International Trade Commission, 1 USPQ.2d 1241, 1245 (Fed. Cir. 1986), cert. denied, 482 U.S. 909 (1987) ("Under 35 U.S.C. §102, anticipation requires that each and every element of the claimed invention be disclosed in the prior art").

The optical waveguide probe according to the present invention is a thin film structure. As pointed out above, amended independent claim 1 recites that the inventive optical waveguide probe comprises a support substrate, a thin film optical waveguide formed of a thin film deposited on the substrate and having an elongated portion over the support member and a cantilever portion extending beyond the support member, a probe provided at a tip of the optical waveguide and comprising sharp tip extending in a substantially vertical direction with respect to the optical waveguide, and a minute aperture at the tip of the probe, and a bent portion joining the optical waveguide and the probe, the bent portion having a deflecting function for deflecting a propagated light in the optical waveguide.

Chiba discloses use of an optical fiber as an optical waveguide and neither discloses nor suggests a thin film optical waveguide structure. Accordingly, applicants respectfully submit that Chiba fails to anticipate independent claims 1, 14, 17 and 23 or dependent claims 2-12, 15-16, 18-22 and 24-30 and that the rejection under 35 U.S.C. §102 should be withdrawn.

In view of the foregoing amendments and discussion, the application is now believed to be in condition for allowance. Accordingly, favorable reconsideration and allowance of the claims are most respectfully requested.

Respectfully submitted,

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MAILING CERTIFICATE

I hereby certify that this correspondence is being deposited with the United States Postal Service as first-class mail in an envelope addressed to: MS FEE AMENDMENT, COMMISSIONER FOR PATENTS, P.O. Box 1450, Alexandria, VA 22313-1450, on the date indicated below.

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Name

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Signature

August 11, 2003

Date